

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

IN THE CLAIMS:

1. (Previously presented) A radio-frequency amplifier comprising:
a transistor having an input terminal, an output terminal, a control terminal, and a transconductance g_m ;
a series-connected feed-through impedance connected in parallel with the input terminal and the output terminal of the transistor;
a load resistance R_L connected to the output terminal of the transistor; and
wherein the control terminal of the transistor is biased at a fixed voltage, and the transistor and a signal source impedance r_s satisfy the equation:

$$g_m = \frac{1}{r_s} \left(\frac{\delta \alpha}{\gamma} (1 + \chi)^2 \eta(\omega_o) + \eta^2(\omega_o) \right)^{-\frac{1}{2}}$$

where

- | | | |
|------------------|---|---|
| δ | = | a gate noise coefficient of the transistor, |
| α | = | a ratio of g_m to a channel conductance at zero drain-to-source voltage of the transistor, g_{d0} , |
| γ | = | a channel thermal noise coefficient of the transistor, |
| χ | = | a ratio of a backgate transconductance g_{mb} of the transistor to g_m . |
| ω_o | = | an operation frequency, and |
| $\eta(\omega_o)$ | = | a ratio of a gate admittance g_g of the transistor to g_m . |

2. (Original) The radio-frequency amplifier of claim 1 further comprising a tank circuit connected between a voltage source V_{dd} and the input terminal of the transistor.
3. (Previously presented) The radio-frequency amplifier of claim 1 wherein the transconductance g_m of the transistor is larger than $1/r_s$.

4. (Previously presented) The radio-frequency amplifier of claim 1 wherein the feed-through impedance is formed by a real resistor R_p in parallel with the transistor drain-source small-signal resistance r_{ds} .

5. (Previously presented) The radio-frequency amplifier of claim 3 wherein the feed-through impedance further comprises an inductance L_p .

Claim 6 (cancelled).

7. (Previously presented) The radio-frequency amplifier of claim 2 wherein the tank circuit comprises a parallel combination of a resistance, a capacitance, and an inductance.

Claims 8-11 (cancelled).

12. (Previously presented) A radio-frequency amplifier comprising:
a common gate amplifier having an input and an output; and
a feed-through circuit having a resistance R_f coupled in parallel with the common gate amplifier, wherein the resistive feed-through circuit reduces output noise power, and the common gate amplifier and a signal source impedance r_s satisfy the equation:

$$g_m = \frac{1}{r_s} \left(\frac{\delta \alpha}{\lambda} (1 + \chi)^2 \eta(\omega_o) + \eta^2(\omega_o) \right)^{-\frac{1}{2}}$$

where

g_m = an amplifier transconductance,
 δ = a gate noise coefficient of the amplifier,
 α = a ratio of g_m to a channel conductance at zero drain-to-source voltage of the amplifier, g_{d0} ,
 γ = a channel thermal noise coefficient of the amplifier,
 χ = a ratio of a backgate transconductance g_{mb} of the amplifier to g_m ,
 ω_o = an operation frequency, and
 $\eta(\omega_o)$ = a ratio of a gate admittance g_g of the amplifier to g_m .

13. (Previously presented) The radio-frequency amplifier of claim 12 wherein the feed-through circuit further comprises an inductance L_p .

14. (Previously presented) The radio-frequency amplifier of claim 12 wherein the feed-through circuit comprises a feed-through resistance R_p and a feed-through capacitance C_p .

Claim 15 (cancelled).

16. (Previously presented) A radio-frequency amplifier comprising:
a common gate amplifier having an input and an output; and
common gate amplifier transconductance and feed-through means for reducing transistor noise that is passed on to the load, wherein the common gate amplifier transconductance and feed-through means satisfies the equation:

$$g_m = \frac{1}{r_s} \left(\frac{\delta \alpha}{\lambda} (1 + \chi)^2 \eta(\omega_o) + \eta^2(\omega_o) \right)^{-\frac{1}{2}}$$

where

g_m = an amplifier transconductance,
 r_s = signal source impedance
 δ = a gate noise coefficient of the amplifier,
 α = a ratio of g_m to a channel conductance at zero drain-to-source voltage of the amplifier, g_{d0} ,
 γ = a channel thermal noise coefficient of the amplifier,
 χ = a ratio of a backgate transconductance g_{mb} of the amplifier to g_m ,
 ω_o = an operation frequency, and
 $\eta(\omega_o)$ = a ratio of a gate admittance g_g of the amplifier to g_m .

Claim 17 (cancelled).

18. (Previously presented) The radio-frequency amplifier of claim 16 comprising:
a first stage including the common gate amplifier transconductance and feed-through means;
a second stage coupled to the first stage including a common-source amplifier with inductive degeneration; and

a third stage coupled to the second stage including a common-source amplifier with inductive degeneration.

19. (Previously presented) The radio-frequency amplifier of claim 16 wherein the common gate amplifier transconductance and feed-through means further comprises a resistance R_f .

20. (Previously presented) The radio-frequency amplifier of claim 19 wherein the resistance R_f is formed by a resistance R_p in parallel with a transistor drain-source resistance r_{ds} .

21. (Previously presented) The radio-frequency amplifier of claim 16 wherein the common gate amplifier transconductance and feed-through means further comprises an inductance L_p .

22. (Currently amended) The radio-frequency amplifier of claim 16 driven by a signal source with output impedance r_s , wherein a transconductance g_m of the radio-frequency amplifier is larger than $1/r_s$, a series-connected resistor R_f and capacitor C_f is connected between the input **terminal** and the output **terminal** of the radio-frequency amplifier, so that the real part of an input impedance of the radio-frequency amplifier is increased.

23. (Previously presented) The radio-frequency amplifier of claim 1 wherein oscillation is prevented by ensuring that the real part of an input port impedance Z_{in} and the real part of an output port impedance Z_{out} are positive, where $\text{Re}[Z_{in}]$ and $\text{Re}[Z_{out}]$ can be expressed as

$$\text{Re}[Z_{in}] = \frac{R_f + \text{Re}[Z_L]}{1 + g_m R_f (1 + \chi)}$$

$$\text{Re}[Z_{out}] = R_f + [g_m R_f (1 + \chi) + 1] \text{Re}[Z_S]$$

where

R_f = a feed-through resistance,
 Z_S = a source impedance, and
 Z_L = a load impedance.

24. (Previously presented) The radio-frequency amplifier of claim 12 wherein oscillation is prevented by ensuring that the real part of an input port impedance Z_{in} and the real part of an output port impedance Z_{out} are positive, where $\text{Re}[Z_{in}]$ and $\text{Re}[Z_{out}]$ can be expressed as

$$\text{Re}[Z_{in}] = \frac{R_f + \text{Re}[Z_L]}{1 + g_m R_f (1 + \chi)}$$

$$\text{Re}[Z_{out}] = R_f + [g_m R_f (1 + \chi) + 1] \text{Re}[Z_S]$$

where

R_f = a feed-through resistance,
 Z_S = a source impedance, and
 Z_L = a load impedance.

25. (Previously presented) The radio-frequency amplifier of claim 16 wherein oscillation is prevented by ensuring that the real part of an input port impedance Z_{in} and the real part of an output port impedance Z_{out} are positive, where $\text{Re}[Z_{in}]$ and $\text{Re}[Z_{out}]$ can be expressed as

$$\text{Re}[Z_{in}] = \frac{R_f + \text{Re}[Z_L]}{1 + g_m R_f (1 + \chi)}$$

$$\text{Re}[Z_{out}] = R_f + [g_m R_f (1 + \chi) + 1] \text{Re}[Z_S]$$

where

g_m = an amplifier transconductance,
 R_f = a feed-through resistance,
 Z_S = a source impedance,
 Z_L = a load impedance, and
 χ = a ratio of a backgate transconductance g_{mb} of the amplifier to g_m .

Claims 26-28 (cancelled)

29. (Currently amended) A radio-frequency amplifier comprising:
a common gate amplifier having an input and an output; and
common gate amplifier transconductance and feed-through means for reducing transistor noise that is passed on to ~~[[the]]~~ a load, ~~[[16]]~~ wherein oscillation is prevented by ensuring that

the real part of an input port impedance Z_{in} and the real part of an output port impedance Z_{out} are positive, where $\text{Re}[Z_{in}]$ and $\text{Re}[Z_{out}]$ can be expressed as

$$\text{Re}[Z_{in}] = \frac{R_f + \text{Re}[Z_L]}{1 + g_m R_f (1 + \chi)}$$

$$\text{Re}[Z_{out}] = R_f + [g_m R_f (1 + \chi) + 1] \text{Re}[Z_S]$$

where

- g_m = an amplifier transconductance,
- R_f = a feed-through resistance,
- Z_S = a source impedance,
- Z_L = a load impedance, and
- χ = a ratio of a backgate transconductance g_{mb} of the amplifier to g_m .